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Cost-effective Purchasing in Offshore Wind Farm Projects

- Utopia or an Opportunity to Contribute to a More Efficient Supply Chain?

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Abstract

The challenge of reducing cost of energy (CoE) is one of the most triggering issues in relation to the establishment of offshore wind farms. In this context the role of purchasing gains relevance, as wind farm projects entail large scale procurement and involve several suppliers. This article focuses on identifying to which extent cost-effective purchasing activities are taken into consideration when establishing offshore wind farms. This is done through a case study that followed purchasing practices in a North European offshore wind farm project. Preliminary findings indicate that:

- Purchasing seems to be a somewhat unconscious process and characterized by individual organizational goals.
- Supplier selection process is to a high extent based on offshore track record and earlier project collaboration.
- Project purchasing competencies are biased between the technical and commercial personnel.

In order to reduce CoE in offshore wind farm projects, project purchasing deserves to be taken into consideration as a contributor to a more efficient supply chain.

Introduction

Offshore wind farms are technological masterpieces and they contribute to the production of environmentally-friendly electricity. In pace with the increasing interest towards renewable energy forms the offshore wind energy industry is growing rapidly. Yet, the industry is still relatively new - the first offshore wind farm was established in 1991 in Vindeby in Denmark, and in that sense the sector is still in the process of becoming more industrialized (1). Moreover, implementing offshore wind parks is a costly affair, and in this context it is often mentioned that the cost of energy (CoE) must be reduced by 50 % before offshore windmill parks can be considered as a real alternative to other energy forms (2).

Remarkable technological efforts are carried out in order to reduce CoE, but apart from this important focus we should not forget that offshore wind farms are projects that entail a noteworthy amount of purchasing activities and involve a great number of suppliers. Purchasing in projects is generally considered as an overseen area (3), even though purchases in projects can cover up to 70-80 % of the product's or service's total costs (4, 5, 6), and "*procurement's tactical potential as a cost killer is no secret*"(6, p. 114).

This study aims at shedding light on this relevant, but somewhat overseen area in the offshore wind farm context. This is done by answering the following two-fold research question: *Which cost-effective purchasing elements can be identified and how are they practised in the offshore wind farm context?* The elements of the cost-effective purchasing are identified through existing literature and by conducting a case study that focuses on unrevealing purchasing practices in a Northern European offshore wind farm.

By posing this question this article wishes to emphasize the importance of paying attention to the business administrative issues in a highly technology- based industry. The article is structured as follows. In the next section the methodology is presented. Thereafter, the elements of the cost-effective purchasing identified in an iterative way by combining the case study observations with the existing project purchasing literature. Finally, managerial implications and further research areas are presented.

Methodology

In this preliminary phase of the project phase a qualitative case-based research design was chosen. The data collection was based on semi-structured interviews with companies involved in the same North European Offshore Wind Farm project. The research conducted was a point of departure for a four-year research project focusing on the business development possibilities for Danish small- and medium-sized companies that are engaged in the offshore wind farm projects. There is only scarce business administration –related research available within this field, and the empirical starting point for conducting this somewhat explorative case study was to become acquainted with some actors within the sector and in that way grasp some characteristics typical to the sector. There was a focal company, an electronic system supplier that had played an active role in realising the above-mentioned project. This focal company was of remarkable assistance in helping to establish the contacts with the other four interviewed companies. In other words, one may argue that the selection of the participating companies was random, but nevertheless, it provided an applicable foundation for a research project that is in an early phase. Moreover, the selection of the companies represented the typical structure of supplier tiers in an offshore wind farm project.

In total 10 interviews were conducted during the case study period (March – August 2013) in 5 different companies. The persons interviewed were project managers in three of the companies, as well as a single purchasing manager. In the remaining two companies key account managers and a technical specialist were interviewed. The interviews lasted between 30 minutes and 1½ hours and they were recorded. Thereafter the interviews were transcribed and analysed in NVivo (computer software to analyse qualitative data).

In conducting this study a hermeneutic or interpretive (7) methodology appeared useful. The interviewed persons were somewhat unaware of their buying practices, and the aim of the interviews conducted was not reflect a complete or accurate account of reality (8). Instead, during the interviews the informants could tell stories and experiences regarding the studied theme, and it was important that they were directed by a strictly designed interview questions. In the following chapters the elements of cost-effective project purchasing practices are identified and discussed by iteratively combining case study observations with the existing project purchasing literature.

Elements of the cost-effective purchasing in projects

The challenge of reducing cost of energy (CoE) is one of the most triggering issues in relation to the establishment of offshore wind farms. In this context the role of purchasing gains relevance, as wind farm projects entail large scale purchasing and involve several suppliers. Therefore, cost-wise conscious purchasing is important. The case study conducted in an offshore wind farm context accompanied by the study of the prevailing project purchasing literature revealed some interesting characteristics that are presented below.

Project purchasing as a collaborative and incentive-based practice

Projects are complex, temporary organisations that involve various project actors. Regarding offshore wind farms, as well as many other construction projects, there is a clear tendency towards a more diversified use of suppliers in pace with that project actors focus on their core activities and delegate the non-core activities to other partners. As a result of this, there can be identified a multiple layer of supplier tiers. This calls for an enhanced coordination of project purchasing activities in order to deliver a successful project, both regarding time, quality and budget. There can be found several contribution in the literature arguing that purchasing in projects ought to be seen as a joint and a cooperative effort (9, 10, 11, 12). Moreover, these contributions highlight the fact that purchasing strategies relying on inter-organisational relationships and joint efforts to deliver a project have shown to have a positive effect in the project outcome in terms meeting the time, quality and cost requirements.

Olsen et al. (13) studied different procurement contracts and how different governance systems (incentives, authority and trust) affect the project outcome. They argued for the importance of multiplier use of governance mechanism that stimulates and enhances a common focus on joint goals. This means also that a strong focus on own individual project goals is likely to worsen the end-result of any project outcome in terms of e.g. delays and higher prices than budgeted

Pesämaa et al. (11) suggested a cooperative model for procurement in projects that takes into account three interdependent constructs. These constructs – incentive-based compensation, limited bidding options and task-related, careful partner selection have a positive outcome for

project results, but all three constructs must be present, however, in a unique sequential order to enhance cooperative procurement.

In the case study conducted these collaborative efforts were limited, and purchasing was considered more like an individual, organisational construct that was integrated to the project delivery through various project managers. Many of the interviewed persons highlighted the importance of their own companies to live up to the tight project delivery time schedule. One of the interviewed persons pointed this out by stating:

"It is very important for us to deliver upon the agreed project time schedule. If we don't, we have to pay daily fines. We tell the same to our suppliers". (An interviewed project manager).

The collaborative efforts to coordinate purchasing activities could though be identified among those companies that were partners in the particular project.

Appropriate and relationship-based supplier selection

Secondly, the role of suppliers in project businesses has gained relevance in pace with that project-based firms to an increasing degree concentrate on their core businesses and outsource non-core activities to other suppliers (14). This trend can also be observed in the academic topics within project management literature that are concerned with such issues as supplier integration (15) and supplier capabilities (14).

Supplier selection plays also a crucial role in a more traditional organisational buying behavior. When determining the product or service specification, buyers may already have potential supplier choices in mind, and in some cases the availability of suppliers and their capabilities may even influence the outcome of a product or service specification. In the generic buy phase models the supplier selection is directly referred to when we talk about searching for the potential supplier, evaluating them and finally selecting them. Research in supplier selection has been concerned with finding the 'perfect' supplier in order to make the buying process as effective and efficient as possible. In this context different techniques have been applied, e.g. multi-criteria decision aid, problem structuring approaches, as well as mathematical programming and data mining techniques.

Apart from the techniques mentioned above supplier selection has been related to the diversity of buying situations combined with complexity and importance of the buying situation. However, selecting suppliers cannot only be considered as finding the perfect match from a supplier category (5). It is far more likely that situational factors, such as the number of suppliers available, the importance of the purchase, as well as the importance of a supplier relationship and the nature of uncertainty play a significant role. In this context the IMP-Groups (Industrial Marketing and Purchasing) research on business relationships states that these relationships play a more important role than purely focusing on transactions and perfect matches.

The selection of the appropriate suppliers has shown to play a crucial role in projects. For example, Pesämaa et al. (11, p. 558) discovered that "invitation of a limited number of trustworthy and competent bidders, incentive-based compensation and careful partner selection based on task related attributes, enhances cooperation between clients and contractors". Task related attributes include earlier experiences, interpersonal skills and technical competence (11).

The findings from the interviews indicated clearly that supplier selection in the projects was based on both project-specific standards and long-term relationships between the project actors. The project-specific standards were concerned on two particular issues. Firstly, any tender that exceeds DKK 2.8 million must be effected via an EU call. In this case the value of the purchases was more than DKK 1.0 billion and resulted in an EU call. This meant that the supplier base could become more international than might have been the case, if the value of the tender was lower than EU's limit.

Secondly, in order to become a 1. tier supplier to an offshore wind farm project the potential suppliers had to become prequalified. By this is meant that potential suppliers should be able to document that they have provided similar solutions to the satisfaction of other customers, and that they will be able to do it again. In other words, the potential suppliers must present themselves as reliable and professional partners and suppliers of high-quality solutions.

Along the lines with EU standards and the lack of some 1. tier suppliers the interviews revealed that the supplier selection to a large extent was based two particular issues, namely almost institutionalized buyer- seller relationships that had developed over many years' collaborations between different project partners. Also, the fact that offshore projects in general were complex and costly projects were meeting the time schedule was very crucial. In relation to this, one of the project managers stated:

"If we had good experiences with the specific supplier in a previous project, we were likely to use them again. In this way you know what you have, and you also know that this supplier delivers in time."

Two of the interviewed companies had developed a partnership over the many years' collaboration in different offshore project. A project manager of one of the firms affirmed this by stating:

"They have a subsidiary physically located by us, and we have worked together for many years. Our activities complement each other. We finish the tenders always together and our collaboration works in an outstanding way".

Another peculiar characteristics was the observed strong 'offshore spirit'. To put it other words, without previous experience in offshore oil or wind projects the possibilities to be selected as a supplier were few. One of the informants explained this by saying:

"Delivering to offshore projects is difficult, because the conditions are rather extreme. If you haven't tried it before you simply don't know what is required. For example, we visited a former ship yard that was interested in becoming supplier to offshore, but when we saw their equipment we had to tell them that they were not good enough for offshore. One thing is to a build a ship, another one to build an offshore platform".

However, even though supplier selection was based on earlier track record and long-term relationships between the project partners, the interviews also indicated that more arm's length –like relationships could also take place. This was especially the case when subcontractors were selected to the project. A project manager told the following:

"Some of the components that were needed for the project were standard products and there were several potential suppliers for that. Earlier, we were likely to use the same subcontractor, but now, we have started asking two to three alternatives. Just to make sure that we get the right price".

To summarize, the supplier selection in the studied case was based on project- specific traits in terms of EU standards and the necessity of a relevant track record. Moreover, supplier selection was also based on long-term project relationships and the prevailing strong offshore 'spirit'.

Project purchasing competences

Thirdly, as project are complex purchasing processes the competencies related to these activities can also be considered as contributors to a more cost-effective practices. There can be identified research concerned with purchasing competence (16, 17). Finding the appropriate supplier is not only a question of technical skills or potential, it is also an issue of selecting the right supplier that can provide the given product for the right costs. In this context supply base optimisation (16,17), quantitative skills (18) and supply market knowledge (19) have been mentioned.

This point of 'careful og right supplier selection' deserves a further note. Rwelamila and Edries (20) investigated in their study the project procurement competence among civil engineer consultants. Rwelamila and Edries (20) discovered that they "are unaware of or underinformed about the various construction project procurement systems available"(p.182). They further stated that selection criteria were based on biased past experience and conservative choices. This view is interesting, as in one hand there is strong evidence that partnering-like, collaborative-based buyer-supplier relationships are favourable in the projects, but provokes a further question, whether the suppliers selected are always the most appropriate ones for the project. In this context path-dependency and earlier project experiences seem to play a crucial role.

The interviews revealed a buying group that laterally involved mainly technical specialists. These specialists could be in-house engineers, or specialists recruited to the task externally. Two of the interviewed companies mentioned that their purchasing department was involved in the activities, by meaning the earlier mentioned commercial purchasing department that to a high extent was responsible for contractual issues and order routines.

The fact that the purchasing activities were divided between two different types of buyer profiles, i.e. technical and commercial specialists, was one of the interesting findings in these interviews. In the earlier projects the technical personnel seemed to be most involved ones in the project purchasing tasks. In one of the companies the commercial purchasing department was just under development and the project manager expressed this development in the following way:

"Previously, our engineers also negotiated the contracts with the suppliers. Now this task has been moved to the commercial purchasing department where they are specialists in negotiation".

Another project manager mentioned the increasing involvement of the commercial purchasing department is the following way:

"Our commercial purchasing department has traditionally been involved in screening the market for new potential suppliers, controlling the financial stability of them and being responsible for the contract-specific issues. However, we have decided that next time when we start visiting the companies in the beginning of the project we will take some persons from the commercial purchasing department with us. In this way they get better understanding of the project".

A further important finding from the interviews was related to the role of project managers in the buying groups. While the OBB literature recognized the gatekeeper role as being those who control the flow of information and materials into the buying group, this study emphasized the coordinating role of the project managers to ensure that materials and services bought were delivered to the project according to the time schedule. In that sense project managers could be considered as boundary spanners between different projects actors' purchases.

These chapter have reported three elements that can be considered as relevant to have more cost-effective purchasing practices. The findings are summarized below in Table 1.

Project purchasing characteristics	Project purchasing characteristics identified in the literature	Case observations
<i>Organisation of the project purchasing</i>	<ul style="list-style-type: none"> • Purchasing practises in accordance with the project type • Collaborative, incentive-based actions to ensure a desirable project outcome 	<ul style="list-style-type: none"> • Individual organizational goals • Daily fines, if not delivered on time
<i>Supplier selection</i>	<ul style="list-style-type: none"> • Limited bidding options • Task-related, careful partner selection 	<ul style="list-style-type: none"> • Similar project track record • Regulations • Project history -> strong path dependency
<i>Project purchasing competence</i>	<ul style="list-style-type: none"> • Purchasing competence • Project procurement competence • Network competence 	<ul style="list-style-type: none"> • Role diversification between technical and commercial buyers • Project managers as interface integrators

Table 1: Research findings

Conclusions and further research

This study shed light on the project purchasing practices in an offshore wind farm context. Three purchasing areas were recognized as being important for a more successful and effective project purchasing practice:

- Collaborative, incentive-based activities to ensure a positive project result.
- Appropriate and task related supplier selection.
- Relevant project purchasing competencies.

The case in an offshore wind farm context revealed that in general there was a minor focus on project purchasing. Practices were characterized by individual organizational goals, and supplier selection was to a large extent based on previous experience and well-established relationships. Moreover, there could be identified biased purchasing competencies among the team members, especially between the technical and the commercial buyers. Finally, project

managers gained an important role in coordinating the purchasing interfaces between different supplier tiers.

Offshore wind farm projects can benefit from focusing on the purchasing processes when planning and implementing projects. By doing so, a combined technological and business administrative effort to reduce CoE is likely to have a positive effect on the offshore wind farms' supply chains.

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